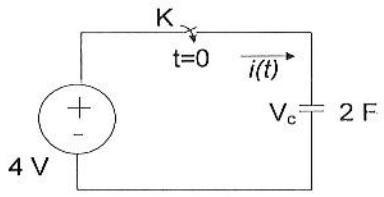
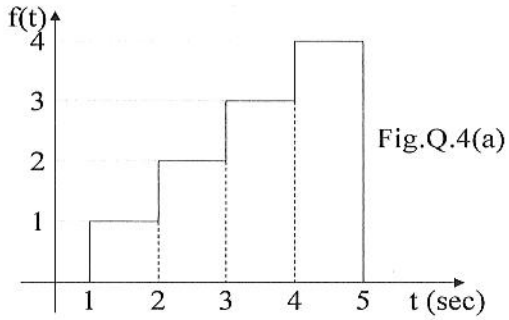
Ref. No. : Ex/EE/5/T/112/2018(S)

B.E ELECTRICAL ENGINEERING (PART TIME) FIRST YEAR FIRST SEMESTER
SUPPLEMENTARY EXAM 2018
SUBJECT: - CIRCUIT THEORY

Time: Three hours

Full Marks: 100
(50 marks for this part)

Use a separate Answer-Script for each part

No. of Question		PART -I Answer any Three (Two marks reserved for well organized answers)	Marks
1)	a)	With suitable examples state the differences between static and dynamic systems and continuous and discrete time systems.	(8)
	b)	Briefly discuss a passive network and a causal network.	(8)
2)		Define a unit step function, unit ramp function and a unit impulse function. Explain how they are interrelated.	(16)
3)	a)	Explain why the capacitor can be represented as a short circuit at $t = 0^+$.	(8)
	b)	In the circuit given in Fig.Q.3(b), find the current *i(t)* through the capacitor when the switch K is closed at $t = 0$. Explain the result so obtained. Given: $V_C(0^-) = 0$.  Fig. Q.3(b)	(8)
4)	a)	Find the Laplace transform of the following signal:  Fig.Q.4(a)	(8)
	b)	Write a short note on the concept of complex frequency.	(8)
5)	a)	State and derive the initial value theorem and final value theorem.	(8)

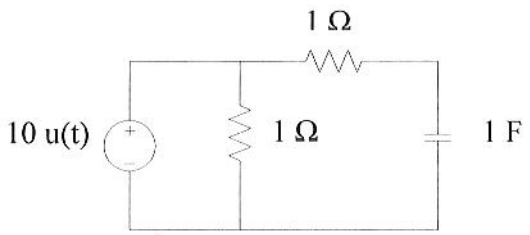
(please turn over)

Ref. No. : Ex/EE/5/T/112/2018(S)

B.E ELECTRICAL ENGINEERING (PART TIME) FIRST YEAR FIRST SEMESTER
SUPPLEMENTARY EXAM 2018
SUBJECT: - CIRCUIT THEORY

Time: Three hours

Full Marks: 100
(50 marks for this part)

b)	In the circuit shown in Fig Q.5 (b) determine the initial and final values of the current through the 1F capacitor.  Fig.Q.5 (b)	(8)

Ref. No. Ex/EE/5/T/112/2018(S)

BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) FIRST YEAR FIRST SEMESTER SUPPLEMENTARY EXAMINATION , 2018

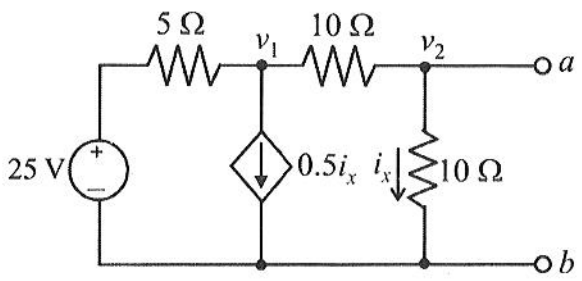
SUBJECT : CIRCUIT THEORY

Time : Three hours **Full Marks -100**
(50 marks for each part)

Use a separate Answer-Script for each part

No. of question	**Part II** **Answer any three questions.** **Two marks reserved for neatness and well organized answer.**	Marks
1.a)	Explain the following with suitable example: (i) Tree (ii) Cut-Set (iii) Incidence Matrix and (iv) Fundamental Tie-Set.	8
b)	Derive equilibrium equations of any electrical network on loop basis using the tie-set matrix of the network.	8
2.a)	Draw the Graph of the network whose node-element incidence matrix is shown below. Select a Tree of the Graph and write down the Cut-Set matrix.	8
b)	Write a short note on dot convention of magnetically coupled circuit.	6
c)	State Superposition Theorem.	2
3.a)	State and explain Norton's Theorem.	4
b)	Find Thevenin's and Norton's equivalent circuits through terminals a & b for the circuit shown in figure :	8

node nos. \ element nos.	1	2	3	4	5	6	7	8
1	1	0	0	0	1	0	0	1
2	0	1	0	0	–1	1	0	0
3	0	0	1	0	0	–1	1	0
4	0	0	0	1	0	0	–1	–1



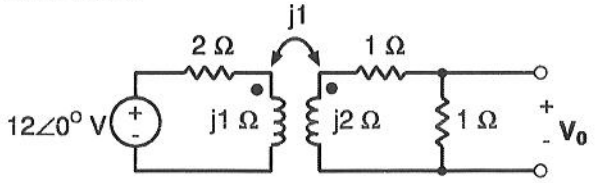
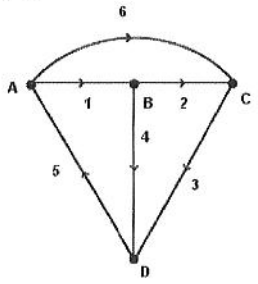
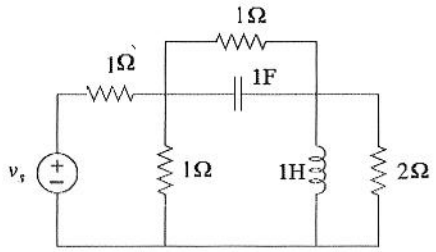
Ref. No. Ex/EE/5/T/112/2018(S)

BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) FIRST YEAR FIRST SEMESTER SUPPLEMENTARY EXAMINATION , 2018

SUBJECT : CIRCUIT THEORY

Time : Three hours **Full Marks -100**
(50 marks for each part)

Use a separate Answer-Script for each part

c)	Two coils with self inductance of 2 H and 5 H are mutually coupled, the coefficient of coupling being 0.5. The coils are connected in series and produce flux in the opposite directions in the common magnetic circuit. Find equivalent inductance of the combination.	4
4.a)	Find V_0 for the circuit shown below: 	8
b)	Find the no of possible trees of the given graph. Also write down the reduced incidence matrix, tie-set matrix & cut-set matrix of the graph shown below: 	8
5.	Draw the directed graph of the network. Write the tie-set matrix and hence obtain the equilibrium equation on loop basis. Calculate the values of branch currents and branch voltages of the network. 	16